

CLAIMS

What is claimed is:

- 1 1. An electrical circuit, comprising:
2 a dissipative clamp circuit coupled to an input of the electrical circuit;
3 an inductive element coupled between the dissipative clamp circuit and an
4 output of the electrical circuit; and
5 a switch coupled in series with the inductive element;
6 the dissipative clamp circuit coupled to provide a clamp voltage across the
7 inductive element, the clamp voltage provided by the dissipative clamp circuit
8 responsive to conditions at the input of the electrical circuit, the dissipative clamp
9 circuit coupled to maintain a voltage across the switch below a switch voltage
10 limit.
- 1 2. The electrical circuit of claim 1 wherein the dissipative clamp circuit is
2 coupled to be responsive to conditions at the output of the electrical circuit.
- 1 3. The electrical circuit of claim 1 wherein the electrical circuit is a power
2 conversion circuit.
- 1 4. The electrical circuit of claim 3 wherein the power conversion circuit is
2 a forward converter power conversion circuit.

1 5. The electrical circuit of claim 1 wherein the inductive element
2 comprises a winding of a transformer.

1 6. The electrical circuit of claim 1 wherein the switch comprises a first
2 transistor.

1 7. The electrical circuit of claim 6 wherein the first transistor comprises a
2 first bipolar transistor.

1 8. The electrical circuit of claim 6 wherein the first transistor comprises a
2 first metal oxide semiconductor (MOS) transistor.

1 9. The electrical circuit of claim 1 wherein the dissipative clamp circuit
2 comprises a second transistor coupled to the inductive element to dissipate energy
3 stored in the inductive element.

1 10. The electrical circuit of claim 9 wherein the second transistor
2 comprises a second bipolar transistor.

1 11. The electrical circuit of claim 9 wherein the second transistor
2 comprises a second metal oxide semiconductor (MOS) transistor.

1 12. The electrical circuit of claim 1 wherein the input of the electrical
2 circuit is coupled to receive an input voltage.

1 13. The electrical circuit of claim 12 wherein the dissipative circuit is
2 coupled to be responsive to varying voltage conditions at the input of the
3 electrical circuit.

1 14. The electrical circuit of claim 12 wherein the input of the electrical
2 circuit is coupled to receive the input voltage from a rectifier coupled to rectify an
3 alternating current (AC) line voltage.

1 15. The electrical circuit of claim 12 wherein the dissipative circuit is
2 coupled to be responsive to a varying amount of energy being clamped across the
3 inductive element of the electrical circuit.

1 16. The electrical circuit of claim 15 wherein the amount of energy being
2 clamped across the inductive element varies in response to a varying peak current
3 in the inductive element.

1 17. The electrical circuit of claim 16 wherein the output of the electrical
2 circuit is coupled to a load, the varying peak current in the inductive element to
3 vary in response to changes in the load coupled to the output of the electrical
4 circuit.

1 18. The electrical circuit of claim 16 wherein the varying peak current in
2 the inductive element is coupled to vary in response to a soft start period of a
3 control of the switch.

1 19. The electrical circuit of claim 1 further comprising a second input
2 coupled to the switch, wherein switching of the switch is responsive to the second
3 input of the electrical circuit.

1 20. The electrical circuit of claim 19 wherein the clamp voltage provided
2 by the dissipative clamp circuit is further responsive to conditions at the second
3 input of the electrical circuit.

1 21. The electrical circuit of claim 1 further comprising a second output
2 coupled to the inductive element, wherein the clamp voltage provided by the
3 dissipative clamp circuit is further responsive to conditions at the second output of
4 the electrical circuit.

1 22. A power supply, comprising:
2 an energy transfer element having an energy transfer element input and an
3 energy transfer element output coupled to an output of the power supply;
4 a switching regulator circuit including a power switch coupled to the
5 energy transfer element input, and a control circuit coupled to the power switch

6 and the output of the power supply, the control circuit coupled to switch the
7 power switch to regulate the output of the power supply; and
8 a dissipative clamp circuit coupled to the energy transfer element input,
9 the dissipative clamp circuit coupled to a power supply input to receive an input
10 voltage, the dissipative clamp circuit including:
11 a sensing network coupled to the power supply input to sense the input
12 voltage;
13 a dissipative element coupled to the sensing network and coupled to the
14 energy transfer element;
15 an energy storage element coupled to the energy transfer element and the
16 dissipative element; and
17 a first diode coupled between the power switch and the dissipative element
18 and the energy storage element.

1 23. The power supply of claim 22 wherein the energy storage element
2 comprises a capacitor coupled to the energy transfer element input and the first
3 diode.

1 24. The power supply of claim 22 wherein the dissipative element
2 comprises a first transistor coupled to the energy storage element, the first
3 transistor coupled to dissipate energy in the energy storage element in response to
4 a signal received from the sensing network.

1 25. The power supply of claim 22 wherein the sensing network
2 comprises:
3 a voltage divider circuit coupled to the reference voltage circuit to provide
4 a scaled voltage responsive to a reference voltage added to the input voltage; and
5 a second transistor coupled to the dissipative element and coupled to the
6 voltage divider, the second transistor coupled to provide a current that is coupled
7 to decrease linearly with increasing input voltage.

1 26. The power supply of claim 25 wherein the reference voltage is
2 provided by a reference voltage circuit coupled to the power supply input, the
3 reference voltage circuit including a zener diode coupled between the voltage
4 divider circuit and the power supply input, the reference voltage circuit further
5 including a second capacitor coupled between the voltage divider circuit and the
6 power supply input.

1 27. A method, comprising:
2 switching a power supply input on an energy transfer element;
3 regulating a power supply output by switching the power supply input on
4 the energy transfer element;
5 clamping a voltage on the energy transfer element to a clamp voltage; and
6 varying the clamp voltage in response to the power supply input.

1 28. The method of claim 27 wherein the varying of the clamp voltage is
2 substantially independent of the power supply output.

1 29. The method of claim 28 wherein the varying of the clamp voltage is
2 further substantially independent of leakage inductance of the energy transfer
3 element.

1 30. The method of claim 27 wherein clamping the voltage on the energy
2 transfer element comprises dissipating energy stored in leakage inductance of the
3 energy transfer element in response to the power supply input.

1 31. The method of claim 30 wherein varying the clamp voltage comprises
2 varying the clamp voltage substantially inversely linearly with respect to the
3 power supply input.